MEDIA RELEASE

14 December 2021

SINGAPORE SCIENTISTS IDENTIFY NEW BACTERIA THAT MAY HELP RESEARCHERS BETTER UNDERSTAND HUMAN INFECTIONS

Figure 1 – From left to right - Dr Chew Ka Lip, Consultant, Microbiology, Department of Laboratory Medicine, NUH; Dr Jeanette Teo, Principal Scientific Officer, Microbiology, Department of Laboratory Medicine, NUH; and Associate Professor Raymond Lin, Head and Senior Consultant, Microbiology, Department of Laboratory Medicine, NUH, and Director, National Public Health Laboratory, NCID. [Photo source: NUH]

Figure 2 - Bacterial colonies of *Staphylococcus singaporensis* growing on a blood plate. [Photo source: NUH]

Singapore – Singapore scientists have identified and named a new species of bacteria, *Staphylococcus singaporensis* sp.nov, named after Singapore. This newly-described pathogen is part of the *Staphylococcus aureus* (*S. aureus*) complex[1]. *S. aureus* is a common bacterial cause of infections. Infections range from skin and wound infections, surgical infections, to blood stream infections which may be fatal.

In a study published in the *International Journal of Systematic and Evolutionary Microbiology on* 26 October 2021, the research groups from the National University Hospital (NUH), National Centre for Infectious Diseases (NCID) and Singapore General Hospital (SGH) studied bacteria isolates which appeared related to *S. aureus*. A total of 43 isolates were included in the study between April 2019 and July 2019.

Whole genome sequencing of the isolates was performed and comparative genome analysis found that 6 isolates out of the 43 were quite different from other members of the *S. aureus* complex. In combination with comprehensive biochemical testing, these 6 isolates were confirmed as a new species. They were given the name

[1] *S. aureus* complex is currently made up of three species, *Staphylococcus aureus, Staphylococcus argenteus* and *Staphylococcus schweitzeri*.

Staphylococcus singaporensis (sin.ga.por.en'sis. N.L. masc. adj. singaporensis; named after Singapore) with isolate SS21^T designated as the type strain.

S. singaporensis is closely related to *S. aureus* and will be identified as *S. aureus* using routine diagnostic tests. Whole genome sequencing is currently required to make the identification. The spectrum of disease caused by *S. singaporensis* will need to be further studied.

The 6 isolates found in the study came from skin and soft tissue infections, and one from the tube inserted after bile duct surgery. The isolates are susceptible to commonly-used antibiotics, unlike some *S. aureus* which have developed multi-drug resistance (termed "MRSA"). *S. singaporensis* also lacks many of the toxin genes frequently found in *S. aureus*. However, more data needs to be collected over time, both locally and globally, to fully understand the impact of the new species. Identifying a new species enables scientists to analyse and predict more precisely the outcomes of infections due to various species.

"The identification of this new species using the latest laboratory tools shows that our scientists in Singapore have the capability to investigate future emergence of new bacteria which may cause outbreaks or severe disease," said Associate Professor Raymond Lin, Head and Senior Consultant, Microbiology, Department of Laboratory Medicine, NUH and Director, National Public Health Laboratory, NCID.

Dr Chew Ka Lip, Consultant, Microbiology, Department of Laboratory Medicine, NUH explained, "There remains much to be done to understand the differences if any, between these organisms in terms of clinical infections and prognosis. This could potentially lead to more tailored clinical care management of our patients to optimise outcomes."

Dr Jeanette Teo, Principal Scientific Officer, Microbiology, Department of Laboratory Medicine, NUH added that, "Emerging technologies like next-generation sequencing bioinformatics analysis have facilitated new species discovery, without which this new finding would not have been possible."

Further research

Meanwhile, the scientists have made available the bacterial strains of the new species to the NUS Department of Microbiology and Immunology. All 6 isolates have also been deposited in international strain repositories. It is essential that future research encompasses clinical observation, as well as basic laboratory research. This will elucidate the basic biology of the new species, and establish the differences between *S. singaporensis* and *S. aureus*, as well as other staphylococcal species.

Chinese Glossary

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Staphylococcus aureus	金黄色葡萄球菌
Staphylococcus singaporensis	新加坡葡萄球菌

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About the National University Hospital

The National University Hospital is a tertiary hospital and major referral centre with over 50 medical, surgical and dental specialties, offering a comprehensive suite of specialist care for adults, women and children. It is the only public hospital in Singapore to offer a paediatric kidney and liver transplant programme, in addition to kidney, liver and pancreas transplantation for adults.

The hospital was opened on 24 June 1985 as Singapore's first restructured hospital. Each year, the Hospital attends to more than one million patients.

As an academic health institution, patient safety and good clinical outcomes are the focus of the Hospital. It plays a key role in the training of doctors, nurses, allied health and other healthcare professionals. Translational research is pivotal in the Hospital's three-pronged focus, and paves the way for new cures and treatment.

A member of the National University Health System, it is the principal teaching hospital of the NUS Yong Loo Lin School of Medicine and the NUS Faculty of Dentistry.

Visit www.nuh.com.sg for more information.

About the National Centre for Infectious Diseases

The National Centre for Infectious Diseases (NCID) is a purpose-built facility designed to strengthen Singapore's capabilities in infectious disease management and prevention. NCID houses clinical services, public health, research, training and education and community engagement functions under one overarching structure. In addition to the clinical treatment of infectious diseases and outbreak management, the expanded roles and functional units of NCID include the National Public Health and Epidemiology Unit, the National Public Health Laboratory, the Infectious Disease Research and Training Office, the Antimicrobial Resistance Coordinating Office, and the National Public Health programmes for HIV and Tuberculosis. Benchmarked to international standards and best practices, NCID will enhance Singapore's ability to effectively manage infectious diseases.

Visit www.ncid.sg for more information.